https://doi.org/10.31871/WJRR.16.2.10
World Journal of Research and Review (WJRR)
ISSN: 2455-3956, Volume-16, Issue-2, February 2023 Pages 06-08

Introduction of a Standard Operating Procedure to Reduce Routine Group and Saves Prior To Emergency Appendicectomy

Tanvi Khetan, Ee Teng Goh, Momotaz Sultana

***Abstract*—Introduction: acute appendicitis is the most common abdominal surgical emergency. Laparoscopic appendicectomy is the gold standard of care in management (78% in 2010)[1]. Major vessel injury is historically reported at around 0.07-0.12%[2]-[5], and is usually associated with a closed approach to pneumoperitoneum induction. Despite lack of national/international guidance or formalised risk stratification protocols in the literature, routine practice often includes group and save samples to be taken pre-operatively for all patients.**

Methods: An audit of appendicectomies was undertaken on patients discharged between 1 January 2020 – 31 December 2020. The primary outcome was incidence of perioperative blood product transfusion, up to 30 days from index admission. A standard operating procedure was developed and reaudit data was undertaken from 1 July 2022 – 31 August 2022.

Results: Of 202 appendicectomies, only one patient required blood transfusion. This was given on day four post-index operation. No patients involved intraoperative major vessel injury and blood transfusion. Re-audit showed reduction of routine group and saves being taken from 98% to 65% with no patients requiring blood transfusion.

Conclusion: Our study suggest that it is safe to cease a blanket requirement for preoperative group and saves with an agreed standard operating procedure with overall reductions of up to 72%.

***Index Terms*— Appendicectomy, Group and Save, Transfusion, Laparoscopy**

I. Introduction

Acute appendicitis is the most common abdominal surgical emergency worldwide, with an incidence of approximately 233 per 100,000 people and roughly 50,000 are performed annually in the United Kingdom alone[6]-[7]. Laparoscopic appendicectomy is currently the gold standard of care in management[8]. Group and saves are used to characterise blood groups by ABO and rhesus D. Hospitals often follow local protocols because there is no specific national/ international/ World Health Organisation guidance for when group and salves should be taken prior to appendicectomy. However, these are frequently sampled prior to any major abdominal procedure. Major intraoperative risks, such as vessel injury, have historically been reported at up to 0.12% and are mostly associated with closed trocar insertion for pneumoperitoneum induction[2]-[5]. Meta-analysis has shown that 30% of health-care resources are overused or misused[9]. Current practice frequently requires two routine group and saves pre-operatively. The aim of this study was to assess the risk of blood transfusions in patients undergoing emergency appendectomies at a district general hospital in the United Kingdom and to suggest a risk stratification protocol for taking group and saves for patients undergoing appendicectomies in an emergency setting.

Tanvi Khetan, Department of Surgery, Barts Health NHS Trust, London, United Kingdom
Ee Teng Goh, Department of Surgery, Barts Health NHS Trust, London, United Kingdom
Momotaz Sultana, Department of Surgery, Barts Health NHS Trust, London, United Kingdom

II. Methods

A retrospective review was conducted on patients who underwent an appendicectomy and were discharged from a district general hospital in London between 1 January 2020 and 31 December 2020. These were identified by searching through digital theatre records for keyword 'appendicectomy'. The incidence of perioperative blood product transfusion was measured 30 days after index admission. Age, sex, open versus closed approaches to primary port insertion, proportions of laparoscopic versus open appendicectomy, and rates of conversion to open or laparotomy were also measured outcomes. A standard operating procedure was developed (fig. 1) and introduced. The audit cycle was completed with reaudit of appendicectomies undertaken from 1 July 2022 to 31 August 2022 inclusive.

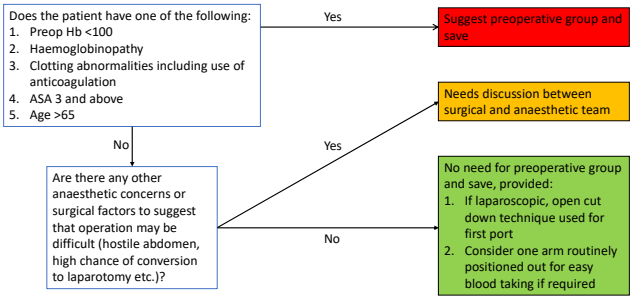

Figure 1: Preoperative group and save standard operating procedure for appendicectomies

III. Results

There were 202 patients who underwent an

appendicectomy over the study period of twelve months in 2020. Overall, the study cohort had a mean age of 32 +/- 17. There were 131 (65%) male and 71 (35%) female patients respectively. A laparoscopic approach was used in 130 (64%) cases, of which 8 (6%) of these were converted to open/laparotomy. Open procedures were performed in 72 (36%) cases. All laparoscopic cases adopted an open approach for primary port insertion and induction of a pneumoperitoneum. Preoperative group and saves were performed on 197 (98%) of the 202 patients, with group and saves performed on 128 (98%) of the laparoscopic cases.

Within 30 days of the initial operation, one (0.5%) case received two units of packed red cells during the study period. This patient was a 63-year-old woman with no medical comorbidities. She had a computerised tomography scan that confirmed she had appendicitis prior to her emergency appendicectomy. She required a re-look laparotomy one day post appendicectomy as she was unwell and persistently hypotensive. At laparotomy, she was found to have a small bowel mesenteric injury with a dusky looking segment of bowel which required ileocolic resection and anastomosis. She was transfused two units of packed red cells on day four after the initial appendicectomy.

A group and save costs £5.99 for the purpose of this study cohort which in the context of these results approximates to £2360.06 annually. Alternatively, one unit of O negative blood costs £138.83.

A standard operating procedure was agreed (fig. 1) and was implemented by May 2022. The standard operating procedure detailed patients that should have group and saves preoperatively: haemoglobin <100g/L, haemoglobinopathy, clotting abnormalities/ on anticoagulation, American society of Anaesthesiologists physical status classification >3 or patients >65 years of age. The reaudit data in 2022 over a two-month period showed a total of 31 appendicectomies performed. The population had a mean age of 31 +/- 15. There were 17 (55%) males and 14 (45%) females among the 31 patients. There were 25 (81%) laparoscopic procedures, 6 (19%) open procedures, and no procedures that were converted to open procedures among the 31 patients. Overall, routine group and save tests taken decreased from 98% to 65%. Eight (26%) of the 20 patients who had group and saves followed standard operating procedure guidelines that were developed, seven (23%) were not followed by the surgical team, and five (16%) were taken by Accident and Emergency staff prior to surgical review. There were no blood transfusions required peri-operatively or up to 30 days after index admission in this cohort of patients.

IV. Discussion

There appears to be no national or international consensus for patients undergoing emergency appendicectomies, and general guidance makes no mention of the need for group and saves for emergency surgeries. The purpose of taking group and saves before surgery is to prepare in case of intraoperative haemorrhage and the purpose of taking two groups and saves is to avoid ABO transfusion reactions caused by patient data mismatch.

Major vascular complications during laparoscopic surgery are estimated to occur at a rate of roughly one in every 1000 procedures, with many studies quoting lower rates[10]-[11]. Bleeding injuries can occur at a number of different stages, during a laparoscopy, the most common vessels for injury including the aorta, iliac arteries and the inferior vena cava, however, most of the complications occur during the initial phase during trocar insertion with a handful of cases documented in the literature[5].

The French Society of Anaesthesiology and Intensive Care have advised against routine group and saves if risk is low, however, what a low risk entails is not defined[12]. Multiple studies have comparable rates to the transfusion rates reported in this study and patients that have undergone blood transfusions are increased in older age groups, patients with pre-existing medication conditions, on anticoagulation or have evidence of preoperative anaemia which were accounted for in the standard operating procedure developed[13]. It is also suggested that alternatively, if a patient were to need an emergency blood transfusion with no cross match taken prior to appendicectomy, O-negative blood can be given whilst a crossmatch is undertaken[14]. Comparable transfusion outcomes have resulted in the safe discontinuation of routine group and saves for selected obstetric and gynaecology procedures. [13], [15]. The standard operating procedure flowchart (fig. 1), developed in our unit, incorporates risk factors that would mitigate against unnecessary regular use of group and saves. In this study, if the standard operating procedure were followed accurately, there would have been a reduction from 98% of patients have group and saves to 26%, with an absolute risk reduction of 72%. We feel that use of such standard operating procedures could be extended to other surgeries including cholecystectomy and hernia repair. However, this would need to be validated with further studies.

The cost of a group and save at the trust in the study was £5.99, however, it is well documented that these costs lie between £15 and £21.30 per sample reported in the United Kingdom with which suggest the range could be up to £2.1 million for group and saves taken nationally for appendicectomies alone and similar costs internationally[13]-[14].

Other factors that were not quantified in this study includes work time loss for venepuncture, repeat testing for sampling errors, as well as overall processing time. These work hours could be better utilised for other health activities in overstretched health systems.

V. Conclusion

Our study findings indicate, in concordance with similar studies, that it is safe to discontinue requirements for routine preoperative group and saves for emergency appendicectomies, if there is an agreed standard operating procedure for exceptional cases. The major benefits would include cost reduction, saving work time hours for staff and improved efficacy of health resources within health services worldwide.

REFERENCES

[1] Ventham NT, Dungworth JC, Benzoni C. Transition towards laparoscopic appendicectomy at a UK center over a 7-year period. Surg Laparosc Endosc Percutan Tech. 2015 Feb;25(1):59-63. doi: 10.1097/SLE.0000000000000017. PMID: 24732741.
[2] Fruhwirth J, Koch G, Mischinger HJ et al. Vascular complications in minimally invasive surgery. *Surg Laparosc Endosc* 1997; **7**: 251–254.
[3] Geers J, Holden C. Major vascular injury as a complication of laparoscopic surgery: a report of three cases and review of the literature. *Am Surg* 1996; **62**: 377–379.
[4] Sandadi S, Johannigman JA, Wong VL et al. Recognition and management of major vessel injury during laparoscopy. *J Minim Invasive Gynecol* 2010; **17**: 692–702.
[5] Magowan D, Smith L, Williams G. Utility of preoperative 'group and save' samples in laparoscopic appendicectomy. The Bulletin of the Royal College of Surgeons of England. 2020;102(7):316–9.
[6] Jones MW, Lopez RA, Deppen JG. Appendicitis. [Updated 2022 Oct 24]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK493193/
[7] Baird DLH, Simillis C, Kontovounisios C, Rasheed S, Tekkis PP. Acute appendicitis. BMJ. 2017 Apr 19;357:j1703. doi: 10.1136/bmj.j1703. PMID: 28424152.
[8] White F, Armstrong L. 767 group & save- are they required for laparoscopic appendicectomies? British Journal of Surgery. 2022;109(Supplement_6).
[9] Zhi M, Ding EL, Theisen-Toupal J, Whelan J, Arnaout R. The landscape of Inappropriate laboratory testing: A 15-year meta-analysis. PLoS ONE. 2013;8(11).
[10] Mechchat A, Bagan P. Management of major vascular complications of laparoscopic surgery. Journal of Visceral Surgery. 2010;147(3).
[11] Asfour V, Smythe E, Attia R. Vascular injury at Laparoscopy: A guide to management. Journal of Obstetrics and Gynaecology. 2018;38(5):598–606.
[12] Molliex S, Pierre S, Blery C, Marret E (2012) Beloeil H [Routine preinterventional tests]. Ann Fr Anesth Reanim 31:752–763
[13] Fadel MG, Patel I, O'Leary L, Behar N, Brewer J. Requirement of preoperative blood typing for cholecystectomy and appendectomy: A systematic review. Langenbeck's Archives of Surgery. 2022;407(6):2205–16.
[14] Ghirardo SF, Mohan I, Gomensoro A, Chorost MI. Routine preoperative typing and screening: A safeguard or a misuse of resources. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2010;14(3):395–8.
[15] Ransom SB, McNeely SG, Hosseini RB. Cost-effectiveness of routine blood type and screen testing before elective laparoscopy. *Obstet Gynecol*. 1995. September;86(3):346–348